Association of Transportation Safety Information Professionals

Application for Best Practices Recognition
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Part One: Project Summary

Project Title: Mobile Capture & Reporting System (MCR)

Project Description: Mobile Capture & Reporting (MCR) is a wireless computer system developed by IDOT for law enforcement agencies. It provides for electronically capturing and submitting crash report data.

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Lead Agency for Project: Illinois Department of Transportation

Participating/Cooperating Agencies: Illinois State Police & Local Law Enforcement

National Agenda Goals:

1 – The MCR project involves leaders who promote the importance of highway safety information systems, used for safety policy and program decision-making.
2 – The MCR project involves the coordination of the collection, management and use of highway safety information among various organizations responsible for highway transportation policy.
3 – The MCR project represents an example of integrating the planning of highway safety programs with highway safety information systems.
4 – The MCR project represents an example where managers and users of highway safety information have utilized the necessary resources to select the appropriate technology to meet information needs.
5 – The MCR project represents examples of highway safety professions being trained in the analytic methods appropriate for evaluation of highway safety information.
6 – The MCR project involves the promotion and use of technical standards for characteristics of highway safety information systems, critical to the development and management of highway transportation safety programs and policies.

Which steps in the Management Process does the project support?
The MCR project supports the following management steps:

(1) Establish Safety Goals, (2)Identify Problems, (3) Plan Programs/Countermeasures,(4) Implement Programs, (5) Monitor Program Operations, and (6) Evaluate Effectiveness.

Reference the priority in your traffic records strategic plan to which this project applies: MCR is the #1 initiative in DTS's Balanced Scorecard Strategic Plan.

Project Cost: planned $: 1,550,620 actual $: 1,494,328

Extent of Project Implementation:
MCR has been fully implemented within District 9 of the Illinois State Police (ISP), where 60 troopers cover seven (7) counties. As of June 2004, MCR will be fully implemented within Region 3 of ISP (approximately 400 troopers). This includes six (6) Districts and covers thirty-four (34) counties. It will also be implemented within ISP's District 15 (Chicago Tollway) and the City of Peoria in a Pilot mode. The remaining statewide implementation within ISP (1100 troopers) is scheduled for completion by June 2005. Additional county and municipal Law Enforcement agencies will also be implemented during this timeframe as appropriate.

Summary of Project Benefits:
Numerous benefits have been realized following the implementation of Mobile Capture & Reporting System (MCR). These benefits have been realized by both IDOT's Division of Traffic Safety and law enforcement within the State of Illinois. The following are some of the benefits of the MCR:

- Improved public safety
- More strategic use of personnel
- Improvement on meeting State and Federal requirements
- More effective use of available funds (i.e. Hazard Elimination)
- Satisfy crash data needs
- Improved responsiveness to the public

If has been estimated that IDOT's Return on Investment (ROI) for this project is approximately 5 years to recover the estimated cost of 3.5 – 5 million dollars. However, this ROI does not take into account the significant cost savings that will also be realized by law enforcement - statewide.

Part Two: Project Detail

Project Description: The MCR project is part of the larger Illinois Crash Reporting System project which has the goal of providing timelier and higher quality crash data for use by IDOT and other crash data stakeholders. To accomplish its goals IDOT realizes it must provide law enforcement the means to reduce the current manual effort and time required to complete and process reports.

The first phase of this project provides an electronic crash report. The second phase of the project will be to provide electronic citations, overweights and warnings. Future plans include providing additional field reports such as incident reports, tow reports, sworn reports, etc.

A major goal of the MCR product is to leverage the use of available technology to improve the quality, accuracy and timeliness of crash reporting and reduce the time and effort required by the law enforcement officer, the law enforcement office personnel and

IDOT Traffic Safety personnel to handle crash reports. It succeeds in accomplishing this goal via the following components:

Application Features: General User Interface

The MCR Client interface is designed to provide ease of use to the officer in both a mobile and office environment. The interface takes advantage of touch screen capability if available. It also utilizes a series of toolbars which provides easy access to major functionality. Additionally, whenever possible the user is able to pick from a list of valid values for a field, which simplifies and reduces data entry efforts and greatly increases the overall quality of the data.

The crash report interface of the MCR Client is designed to resemble the current paper crash report to the extent possible. However, certain design changes were implemented to simply data entry and group related information. The crash report interface also provides a description for each code and not just the code itself. A report bar has also been included with a series of icons that provide a convenient mechanism to the user to navigate within and manipulate the crash report.

The user interface also includes and Inbox feature which is used to facilitate the review and approval of crash reports by law enforcement. A crash report submitted for approval by an officer automatically appears in the Inbox of the appropriate supervisor for review. This review provides the supervisor with the ability to approve or reject a report. A reject report is sent back to the officer for correction which then automatically appears in the officer's Inbox. Approved reports continue up the approval chain appropriate to the particular law enforcement agency.

Finally, the user interface can be operated in either a day or night mode. The night mode is designed to reduce the light generated by the laptop during night time use.

Cellular Communications The MCR Client utilizes the Illinois Wireless Information Network (IWIN) and CDPD cellular technology to provide complete application functionality in a mobile environment. This communication utilizes compression and encryption to ensure that secured data it transmitted across the available bandwidth. The system also handles drops in communication without loss of data or requiring retransmission of data.

The MCR Client has also been designed so that all the required functionality is available with or without cellular coverage. When an officer is in an area without coverage he/she is still able to complete a crash report and submit it for approval. When cellular coverage becomes available the report will then be communicated in the background leaving the user free to move on to other tasks.

Custom Location Tool with GIS & GPS Integration The MCR Client includes an integrated Location Tool with GIS capabilities to allow an officer to graphically locate an accident location and then automatically populate the location information on the crash report. This location tool is available in the mobile and office environment. In a mobile environment the location tool will leverage GPS capabilities, if available, to automatically position the officer to the precise location of his/her squad car.

Custom Crash Diagram Tool The MCR Client includes an integrated crash diagramming tool. With it an officer is able to easily create the crash diagram portion of the crash report. It provides drag and drop capability of roadway, roadway features, vehicles,

traffic symbols and other symbols. Additionally, the law enforcement agency can use the diagramming tool to create custom diagram templates of high accident intersections or roadway sections and make them available for use by their officers. These custom diagram templates help simplify and streamline the creation of crash diagrams.

Driver's License Barcode Scanner The MCR Client has the capability of scanning a driver's license with a 2D barcode. Once scanned, this data can then be used to automatically populate the driver data on a crash report.

Illinois Law Enforcement Agencies Data System (LEADS) Integration The MCR Client has been designed to allow an officer to populate a crash report with vehicle and person information obtained from the Illinois Law Enforcement Agencies Data System (LEADS). This functionality allows an officer to inquire vehicle and/or person data either directly from within MCR or other software with LEADS access. Once the data is made available it can be simply imported into the crash report thereby eliminating the manual entry of data, saving time and increasing the accuracy of the report.

USPS Zip Code Integration The MCR Client provides integration with zip code data from the United State Postal Service (USPS). This integration helps to reduce data entry effort and improve data quality. For example if zip code is entered for a driver, MCR is able to automatically provide city, state and county.

VIN Assist Integration The MCR Client provides integration with VINAssist which is provided by the National Insurance Crime Bureau. This allows for the validation of vehicle identification numbers and is used to automatically provide vehicle make, model, year and type based on the entry of a valid VIN.

Federal Carrier Database Integration The MCR Client provides integration with a database of commercial carriers provided by the federal government. This integration allows for the automated population of carrier data based on USDOT Number, again reducing data entry efforts and improving the quality of the data.

User Defaults To reduce entry effort MCR allows a user to define default values for certain crash report data fields. For example, a county law enforcement officer could setup the default for the county name (part of the crash location data) to be the name of their county. By default this would automatically appear in the county name field when a new report was initially created. Any defaults can be overridden during entry if required.

Validation The MCR Client provides the ability to validate the data entered within a crash report and provide a list of warnings and errors to the user. It then allows the user to click on an error and it will position to the appropriate field for ease in locating and correcting the problem.

Spell Check The MCR Client provides spell check capabilities whenever necessary to assist the officer in creating quality reports.

Dynamic Validation Rules All validation rules applied to a crash report are capable of being administered by DTS and made automatically available to MCR users. This dynamic validation rule capability allows validation problems and issues to be resolved by DTS on a timely basis and positively impact user satisfaction.

Dynamic Codes All code based data within MCR is capable of being administered by DTS and automatically made available to MCR users. This allows code based information to be easily maintained by DTS and be automatically made available to the MCR users. An example of this would be Traffic Control Device codes.

Certain code based data is maintained by the law enforcement agency. This is also automatically made available to MCR users within their agency. An example of this would be hospital names, EMS agencies, tow companies, etc.

All codes within MCR are driven by effective date. All reports created following the effective date would have access to the new code. However, historical reports would only have access to the codes that were valid as of the date they were created.

Attachments The MCR Client allows additional files and documents related to a crash to be attached and submitted as part of the crash report. An example of using this feature would be to attach word processing witness statement document.

Officer Notes The MCR Client allows the user to attach personal notes to a crash report. These notes are not submitted as part of the crash report but are kept on the officer's local machine.

Customizable Workflow The MCR Client has a built-in, customizable workflow component that facilitates and directs the review and approval of crash reports. Each law enforcement agency can setup their workflow based on the needs of their organization, which may include any number of levels of review and approval as appropriate.

This customizable workflow also allows the law enforcement agency to control who may modify a crash report. MCR can be configured to only allow the originating officer to modify a crash report or it can be configured to allow specific supervisors update authority.

Reporting MCR provides the ability to print a Driver Information Exchange sheet for each motorist involved in a crash. The Driver Information Exchange sheet contains information on all drivers involved in a crash. The motorist report is then completed by the motorist and submitted to IDOT.

The law enforcement agency can also use MCR to print crash reports and all attachments. However, the crash report is not typically produced at the scene. Rather it is printed in office situations when a copy of the report is provided to an individual involved in the accident, a lawyer, etc. The MCR printed crash report shares the same format as the current paper-based process.

Supplemental Crash Reports The MCR Client provides the capability of creating a supplemental report. This is typically done in situations where new information relating to an accident is made available at a later date prompting the officer to update the original crash report. MCR allows the user to access the original crash report, modify the data as required, and then resubmit the report. This Supplemental crash report then goes through the same workflow process as the original.

Local Use Fields A law enforcement agency can define up to 50 local use fields for use on the standard IL Crash Report. These local use fields can be used to collect data for conducting local studies and analysis of crash data that is not supported by the standard crash report data. The law enforcement agency can provide the name to use for these fields and any associated edits. The law enforcement agency can choose whether or not to transfer the local use fields to IDOT.

Transfer Capability Crash Reports can be transferred from on user to another for completion. For example, a partially completed desk report may be transferred to an officer for completion. Also, multiple officers can participate on the completion of a large multi-vehicle crash. Each of the officers would transfer their portions of the report to a single officer where they can be merged into a single report prior to submission.

Audit Trail / Workflow History MCR supports the creation of a complete audit trail and workflow history of crash reports. The workflow history captures the major milestones relating to a particular report, such as when it is submitted, rejected, re-submitted and approved. The audit trail provides field level tracking of the information that was modified within a particular report.

Crash Report Versions MCR supports multiple versions of a crash report. Meaning as laws change or situations arise the physical format of the report can be modified as required by an Application Administrator. These new versions are driven by effective date. All reports created following this effective date would take advantage of the new format, while historical reports would retain their original format.

On-Line Help The MCR Client includes an extensive on-line help facility. This help provides context sensitive help related to specific fields, as well as help related to the application features and functionality.

Search Capability has also been included in the user interface. This provides users with the ability to locate crash reports using a variety of search criteria including name, address, vehicle, location and date information.

Shared Laptop Use The MCR Client allows multiple officers to share a single laptop. The system allows each officer to maintain their own personal settings, as well as providing them secured access to their own reports.

Administration MCR includes a web-based administrative client. It provides the necessary functionality to the law enforcement MCR administrator to administer security, define users, maintain their report review and approval workflow and maintain agency code data.

The administrative application can also be used to export crash data. Primarily this functionality exists for situations were the law enforcement agency requires data to be integrated perhaps within their own record management systems or other applications.

Project Objectives: The following is a list of the objectives of the Mobile Capture & Reporting System (MCR).

- Reduce manual efforts
- Improve data quality

- Reduce time to complete a crash report
- Improve ability to locate accidents
- Increase access and availability to crash data
- Provide timely crash data to law enforcement, IDOT Traffic Safety and other stakeholders
- Improve training/education related to crash reporting
- Improve electronic service to the public
- Provide electronic crash reporting to law enforcement agencies at lowest possible cost
- Reduce paper work related to crash reporting
- Eliminate duplicate entry of crash data
- Improve ability to share crash data
- Reduce personnel costs associated with crash reporting

How MCR relates to the National Agenda Goals

1 – The MCR project involves leaders who promote the importance of highway safety information systems, used for safety policy and program decision-making.

Tim Martin, the Secretary of the Illinois Department of Transportation has stated that his number 1 priority is "Improved Safety on Roads and Bridges". Secretary Martin and Traffic Safety Director Tom Dilello have stressed the importance of highway safety information systems, such as MCR, and its impact on safety policy and program decision-making.

2 – The MCR project involves the coordination of the collection, management and use of highway safety information among various organizations responsible for highway transportation policy.

IDOT currently receives approximately 600,000 paper crash reports per year for processing. The major goal of MCR is to leverage the use of technology to improve the quality, accuracy and timeliness of crash reporting and reduce the time and effort required by the law enforcement officer, law enforcement office personnel and IDOT personnel to handle crash reports. Does it involve the coordination of the collection, management, and use of highway safety information among various organizations responsible for highway transportation policy?

3 – The MCR project represents an example of integrating the planning of highway safety programs with highway safety information systems.

MCR will have a positive impact on roadway engineering, traffic signal warrant studies, speed studies, state property damage identification, project and funding determination, project improvement evaluations, public safety programs and safety project decisions. MCR will be integrated with the Crash Information System which will be the foundation for all safety reporting and analysis systems at IDOT, including High Accident Location, and GIS Crash Analysis.

4 – The MCR project represents an example where managers and users of highway safety information have utilized the necessary resources to select the appropriate technology to meet information needs.

IDOT, NHTSA, and FHWA provided the Division of Traffic Safety and the MCR project team with the necessary resources to select the appropriate technology to meet their objectives. A major goal of the MCR System is to leverage the use of available technology to improve the quality, accuracy and timeliness of crash reporting and reduce the time and effort required by the law enforcement officer, the law enforcement office personnel and IDOT Traffic Safety personnel to handle crash reports.

MCR employs the innovative use of the following data and technology:

- Cellular communications is used by MCR on mobile laptops in the squad car to send and receive data.
- MCR Location tool with GIS and GPS capability to improve ability to locate accidents while also capturing GPS coordinates to improve analysis and access to crash data.
- MCR Diagram tool to provide a visual representation of the crash, roadway and features. The resulting diagrams are used by engineers to evaluate causation and identify potential improvements to roadways and roadway features.
- Automated workflow is provided by MCR to facilitate the electronic review, approval, rejection and correction of crash data.
- Dynamic data validation that can be modified as required and automatically deployed to users that will significantly improve the overall quality of the crash data.
- USPS, Federal Carrier and NICB VinAssist Data integration within MCR that significantly reduces data entry requirements while also improving the quality of the data.
- MCR will be provided free of cost to all law enforcement agencies. Its use will dramatically improve the quality and timeliness of crash data. MCR was developed after an extensive requirements definition phase and pilot were conducted.

5 – The MCR project represents examples of highway safety professions being trained in the analytic methods appropriate for evaluation of highway safety information.

One area of needed improvement identified in the MCR requirements definition was that of education and training of law enforcement related to crash reporting. Implementation plans include extensive training on the use and operation of the MCR System. This includes training on the content and completion of the IL Crash Report. MCR has taken the approach of having the electronic crash report resemble the paper crash report to the degree possible. This was done to reduce the impact on law enforcement personnel using MCR and have a positive impact on the effectiveness of the training.

6 – The MCR project involves the promotion and use of technical standards for characteristics of highway safety information systems, critical to the development and management of highway transportation safety programs and policies.

The MCR project supports the following management steps:

1 Establish Safety Goals, 2 Identify Problems, 3 Plan Programs/Countermeasures, 4 Implement Programs, 5 Monitor Program Operations, and 6 Evaluate Effectiveness. The first step in the MCR project was the development of the planning and requirements specifications document. This product defined the overall goals and objectives and a complete list of emphasis areas that were addressed by the resulting MCR system.

Steps two was to fully research and identify the problem areas to be tackled in the MCR system. Briefly these were: *Crash Report Data Quality*
There is a great disparity in the quality of the paper crash reports received at IDOT Division of Traffic Safety (DTS) from law enforcement agencies. Since the current process is a manual paper process, the quality of the data on the crash report is dependent upon the knowledge and preciseness of the person completing the report.
Crash Report Legibility The poor legibility of crash reports is a problem since data is manually entered from the crash report. This is the case at the law enforcement offices and at DTS.

Redundant Data Entry Efforts There is a lot of redundant data entry effort associated with crash report data. The officer is manually entering the data on the crash report. The law enforcement office is often data entering the crash data into their systems. DTS is also entering the crash report data into the current statewide crash data system. This is inefficient and results in data errors and errors in interpretation of data.

Crash Report Timeliness The manual movement and processing of paper crash reports causes a delay in the progression through the complete process. These delays can occur between the officer and the law enforcement office, between the law enforcement office and higher level law enforcement offices and between the law enforcement office and DTS.

Time Required To Complete Crash Report Any time it takes for an officer to complete a crash report detracts from other law enforcement duties. The time used for completing a crash report is not viewed favorably and there is the desire to reduce the officer's time required to complete the report.

Crash Location The location of crashes is important to many users of crash data within IL State Police (ISP), IL Dept of Transportation (IDOT) and other organizations. The location of crashes is determined by manual review of the information written on the crash report and associating it with an actual roadway location. It can be difficult to relate the location written on the crash report to an actual roadway location. This results in errors and inconsistencies in the location of crashes.

Crash Data Availability Errors and inconsistencies in the crash report data plus the manual processing required, negatively impact the availability of crash data for use by the traffic safety community at-large.

Also included in step two was the selection of a project manager and project team members. A clear consensus was reached between management sponsors and the project team prior to proceeding to step three.
Step three was comprised of detailed analysis and design, followed by development and testing of structured network and program code. A pilot was implementing to evaluate the effectiveness of the strategies/components of the MCR system.

In step four, management sponsors reviewed the results of the pilot and directed the development of resource estimates required for implementation. Department budget and personnel constraints impacted these estimates and the original implementation schedule. Despite these constraints, implementation proceeded in Illinois State Police district 9.

The project team and management sponsors monitored the production operation of MCR. Regular reviews were conducted with users providing feedback.

Finally, in step six, MCR produced crash reports/data were used in the production Accident Information database.

Describe the major process steps for your project, including any unique aspects that enhanced success: The MCR project utilized a spiral development model. A spiral approach was determined to be best in consideration of the risks identified related to the use of new technologies, the need for integration of a variety of technologies and unique end-user requirements of the law enforcement officers. A major contributing factor to the success of the project was the initial and continual involvement by law enforcement in all project phases from planning, requirements definition, design, development, pilot, training and implementation.

Provide the evidence and reasoning used to determine the success of the project:
The following are the results of Law enforcement (users) evaluation of MCR:

- They found the MCR software to be user friendly.
- They believe that MCR enhances their ability to report traffic crashes in a timely manner.

Bottom line cost savings is significant, (i.e., it costs IDOT alone $4 dollars in direct labor costs to process a paper crash report, it only costs $1 dollar to process an electronic crash report).

In addition, electronic crash reports are received in hours versus an average of 45 days.

Why should this project be recognized as a best practice in traffic records?
The MCR project met or exceeded objectives. It is a product which can be offered to law enforcement agencies at no cost. It could be used as a nation-wide model.